

## FOLDING WARDROBE KIT FOR CLAMSHELL-TYPE LUGGAGE CASE

### Background of the Invention:

This invention relates to suitcases of preferably the hard-shell variety but, in any event, a luggage case sized to carry adult clothing or a suit of adult clothing. More particularly, the invention relates to a method for easily packing and folding a suit of adult clothing in a luggage case having a clamshell-type opening such that the clamshell lid can support itself in a vertical or upright position when the case is opened.

Such a suitcase is shown in US patent RE35,563, naming Girard Sisson as the sole inventor and assigned to Samsonite Corporation. In this patent, a bar suitable for receiving the hooked portions of hangers is supported on an erectable structure which pivots above the upper edge of the lid portion of the suitcase.

This erectable bar structure is superior to most packing systems for such luggage cases in that it conveniently positions the hanger-borne suit of clothing in an unfolded erect position to aid the traveler to pack and unpack the suit of clothing from this elevated and erect position. All the traveler needs to do to pack these hanging clothes is to rotate the erected structure into the lid of the luggage case. This folds the suit of clothing approximately in half and places the suit of clothing into the lid portion of a clamshell luggage case.

This patented system, however, is somewhat complicated in that it requires placing the clothing between an inflatable bladder and a rigid bar to grip the folded clothing to prevent the clothing from shifting and becoming wrinkled during transport. Also, the disclosed clothing structure is fixed into the lid of the case. This tends to limit the versatility of the luggage case into which it is installed.

Accordingly, it is an object of the disclosed invention to provide a relatively simple clothing packing and folding

mechanism which permits the traveler to place hanging clothing in an unfolded condition on a support bar, yet folds the clothes neatly into lid of the clamshell-type luggage case with relatively simple operations. Also, it is an object of the subject invention to provide a kit for a luggage case which is easily removable and re-installable into the luggage case depending on whether the traveler wishes to use the kit to fold a suit of clothing into the luggage case, or to use the space in the lid of the luggage case for other travel items.

**Brief Description of the Figures:**

Figure 1 shows the wardrobe kit installed in the lid portion of the luggage case.

Figure 2 is a close-up view of the kit installed in the lid of the luggage case, with the kit in the position for packing a suit of clothing (not shown) in the lid of the luggage case.

Figure 3 is an overview of the luggage case showing the wardrobe kit in the extended position, with the suit of clothes supported by the kit prior to folding into the lid of the luggage case.

Figure 4 shows the kit in the packed position with the suit of clothes folded neatly into the lid of the luggage case.

Figure 5 shows a flexible divider pad clipped over the suit of clothes in the folded condition.

Figure 6 is a close-up view of the left portion of the luggage case lid with the wardrobe kit in the erect position and ready to receive and support clothing on hangers but with the folding bar already in position.

Figure 7 is a close-up view of one of the two flexible strap stays mounted near the hinge, this one at the lower left corner of the luggage case.

Figure 8 is a perspective view of the support bar assembly of the wardrobe kit.

Figure 9 is a perspective view of the removable folding bar assembly of the wardrobe kit.

Figure 10 shows one of the flexible stays removed from the luggage case.

Figure 11 shows an exploded view of the left arm portion of the support bar assembly.

Figure 12 shows a portion of the left arm portion with the detent and the engaging cam portions of the left base.

Figure 13 shows the left arm portion of the support bar assembly installed in the left base which is in turn fixed to the frame of the luggage case lid.

Figure 14 is a more detailed view of that shown in Figure 13 showing the engagement of the end plug of the bar assembly in the socket of the left arm.

Figure 15 shows the bar assembly after being removed from the arm.

Figure 16 shows the folding bar assembly completely removed from the hanger support and the hanger support ready to receive clothing on hangers.

Figure 17 shows the hanger support bar assembly being removed from engagement with the base.

Figure 18 shows the support strap in its nonfunctional position and the rest of the kit removed from the lid of the luggage case.

Figure 19 is a cut-away view of the luggage case showing the end of the left arm and the end plug of the folding bar locked into the base.

Figure 20 is a detail of the base and left arm assembly with the hanger support bar assembly.

Figure 21 is another view similar to figure 20, but with the hanger support in the erect position.

**Detailed Description of the Preferred Embodiment:**

Referring to the figures, the luggage case 1 in which the inventive wardrobe kit 4 is to be attached is preferably of the so-called "hardside" construction. The lid and base portions 2 and 3 are hinged together with a mechanical hinge 7. Each such shell portion is generally rigid or at least has a rigid frame 5 which is structurally strong enough to support its weight, the weight of the traveler's goods packed therein and, more specifically, strong enough to support the wardrobe kit 4 in its

various positions, especially in the erect position shown in Figure 1 for example. While a hardside case is preferred, specifically the Piggyback® luggage case sold by Samsonite Corporation, other luggage cases having the requisite rigidity and strength will serve.

The wardrobe kit itself consists of the following main assemblies. The hanger bar support assembly 20 which consists of a bent wire harp or inverted U-shaped portion 21 which grips a hanger bar 22 at its upper most end as shown in the figures. The hanger bar is sized to receive the hooked portion of conventional clothes hangers H. The wire harp is tall enough to hold a suit of clothes hanging from such a supported hanger above the base shell 3 of the luggage case so that the clothes hang generally straight and vertical. A folding bar assembly 23 is located at the lower most portion of the hanger bar support assembly, and a pair of bases 28 is screwed to the upper ends of the sides of the lid shell. A tensioned support strap 35 extends across the upper portion of the lid shell below the attachment locations of the bases. Lastly, a pair of flexible

stays 10,10 is removably attached to the lid shell and normally extends between the lid and base shells near the hinge. These stays resist the tendency of the lid shell to open to its full horizontal position relative to the base shell.

The base portions are of injection molded plastic and are affixed with screws inside of the frame as stated above. The function of such base is to selectively hold the right or left harp arms of the hanger bar support assembly as will be detailed. The bases also include cam surfaces 25 along which spring-biased detents 26 of the right and left arms ride to help hold the hanger bar assembly in various operative positions. These detents are contained in the right and left arms 30,30 and engage these cam surfaces on the right and left bases 28 to help hold the hanger bar support assembly in the position shown in Figure 1, as well as hold the hanger bar support assembly in the closed position shown in Figure 2.

As stated above, important advantages of the instant invention over the prior art are its ease of use, and ease of removal from

the luggage case when not needed. This removable aspect is greatly aided by the following mechanisms to inter-engage the folding bar assembly and the hanger bar support assembly to one another and the hanger bar assembly to the right and left bases affixed to the lid shell. Referring to various figures in greater detail, one can see that each of the right and left arms have a socket 34 into which a generally square end of the hanger bar plug 32 is normally received. The rear facing side of this square socket is open, thus exposing one of the peripheral slot portions 33 that are molded into the square end plug 32, which is best seen in Figures 13 and 14. In the upstanding position shown in Figure 13, the hanger bar is easily removed and replaced into each of the socket portions of the right and left arms. This is important because this permits easy placement of the suit of clothing on hangers onto the hanger support bar at the top of the hanger bar support assembly. However, in order to block this bar from falling out of the case while the packed clothing is being carried in the luggage case, this exposed slot portion 33 protrudes from the socket 34 and is engaged or held in place by the semicircular cam surface 36 that extends in a

curved path along the outer edge of each of the bases. This is shown best in Figure 19. Here, the cam surface passes into the slot in the end plug of the arm (in this case the left arm) of the folding bar assembly and the flange formed on the end plug of the folding bar. This cam surface extends along approximately 120 degrees of range of rotation of the hanger bar support assembly so that once the hanger bar support rotates past the erect position (Figure 1) toward the packed position, the cam surface 36 locks the folding bar assembly to each of the right and left bases. Thus, generally, it is only when the kit is in the erect position, as shown in Figures 1, 3, 6, and 13 through 16, that the folding bar assembly is easily removed. In the other positions, each of the end plugs is locked in place by the cam surface 36 of the associated base, as shown for example in Figures 19 and 20. The folding bar assembly thus is easily removed both for packing and unpacking, as well as for removing, at the choice of the consumer the entire wardrobe kit.

To remove the entire wardrobe kit (excluding, of course, the right and left bases which are permanently attached to the

luggage case) another feature comes into operation. Each axle on which the hanger bar support assembly rotates includes a lobe 37 that fits into a complementary shaped keyhole-shaped hole 38 in the respective base. This is seen in various figures but more specifically in Figures 13 and 14. Note that the axle lobe is not aligned with the keyhole shape in Figures 13 and 14. Thus, the arms of the hanger bar support assembly are usually locked into engagement with each of the right and left bases. It is only in the position shown in Figure 17 where the major portions of the hanger bar support assembly are substantially horizontal so that the lobe on the arm axle aligns with the keyhole shape of the hole in each of the bases. When held in this horizontal position, the user need only flex the wire harp portions inward, moving the lobes inwardly to pass through the keyhole shapes. This permits the removal of the entire hanger bar support assembly. This opens the lid portion of the luggage case for more general packing and eliminates the kit entirely. The user need only release the conventional buckle fastener on the tension strap as shown in Figure 18. The entire kit is thus set aside for later use.

Also, the flexible strap stays 10 near the ends of the hinge can be disabled merely by unsnapping the snap-type fasteners 11 at their upper ends (best seen in Figure 10 for example). In this condition, the luggage case is more or less a conventional luggage case with both the lid and base shell capable of lying horizontally in the open position for more conventional packing. The divider pad 6, of course, can still be used to hold the traveler's articles in the lid shell to permit the lid and base shell to be folded closed and locked.

The snap-type fastener 11, shown and provided on the flexible stay as seen in Figure 10, includes two mating portions 12 on a central part of the flexible stay. This permits the user to adjust the length of the stays, and thus the angle at which the stays hold the lid shell in the approximately vertical position. This adjustment will permit the lid to remain open while supporting varying amounts of clothing. Also, the flexible stays may stretch if the luggage case remains open for a period of time. Thus, the second position of the snap fastener could

be used to shorten the length of the stay to compensate for this slight stretch.

Referring to Figure 11 and others for some of the details of the preferred construction, the arms of the hanger support assembly include detent 26 and detent springs 27 as mentioned before. Each arm actually consists of two main molded portions, the pivot 39 and the right and left arm portions 31. The pivot includes two slots, each of which can receive a spring-biased detent mechanism. This permits the pivot to be used in conjunction with either the right or left arm portions. Also, Figure 11 shows how the end of the wire harp 21 is clamped between the pivot and the arm portion. Figure 12 shows the inward facing side of one of the bases 28 with its arm portion removed to show the cam surfaces 25 in the path that the detent 26 on the arm passes during the rotation of the hanger bar support assembly.

The preferred operation of the inventive wardrobe kit will now be detailed. For this explanation, we will presume that the kit

has been previously set aside, and the traveler now wishes to use the luggage case as a portable wardrobe for a suit of clothing. In this situation, each of the flexible stays is snapped into place so that the lid shell of the luggage case is held in the substantially vertical position, or slightly past vertical, so that the weight of the lid shell holds tension against the flexible stays.

The hanger bar support assembly, which had been set aside, will now be installed. Referring to Figure 17, this is easily done by holding the wire portion of the assembly in a substantially horizontal position. This places the lobed portions 37 of the axles in correct alignment with the keyhole-shaped openings 38 into each of the right and left bases. The user now locates the bar support assembly into a substantially vertical position, such as that shown in Figure 16. If this has not already been done, the elastic tension strap 35 is now stretched and fastened, placing the elastic strap in a tension position across the front portion the lid shell. In the condition shown in Figure 16, the case is ready to receive the traveler's clothing.

The traveler need only hook the hook portions of the hangers over the hanger bar 22 located at the extreme top end of the hanger bar support assembly. Preferably, the clothes are facing away from the traveler so that the backs of the clothes will be folded over the folding bar. Preferably two, and perhaps three, sets of clothing on hangers can be arrayed on the hanger bar. The traveler smoothes the clothing so that wrinkles are minimized. Then the folding bar end plugs are inserted in each of the right and left arms. The folding bar assembly end plugs are spring biased by a conventional helical spring contained in a cylindrical cavity inside the end plug. These springs push on each end of the ribbed center folding bar. The center folding bar is preferably an extruded fiberglass hollow tube which has extreme rigidity and strength adequate to support the folded clothing during folding and especially during transport. The spring bias provided by the coil springs (not shown) contained within each of the end plugs 32 helps hold the thus outwardly biased plugs in place. Also, it should be noted that the center ribbed portion 24 of the hanger bar can essentially "float" or shift back and forth between the now captured plugs. This helps

prevent extra stress on the plugs which could cause them to pull out of their respective sockets, but also helps the clothes remain on the bar with minimal wrinkling.

So, in this condition (as shown in Figure 3), the clothing is supported from the hangers and hangs by gravity down from the hanger bar and sandwiched between the tension strap in the folding bar assembly. The clothing is also captured between the inner surfaces of the right and left arms. In this position, the user can easily smooth wrinkles and continue to pack the base portion of the clamshell luggage case.

Now, the user merely grips the hanger bar support assembly and pulls forward to overcome the resistance of the detents 26 and the normal force of gravity helping hold the hanger bar support assembly in the erect position. The assembly, the folding bar, and hanging clothes rotate downwardly into the lid of the luggage case to assume the position shown in Figure 4. In this position, the detents 26, carried by the right and left arms 30, pass over the other of the cam surfaces in each of the base .

members to help hold the folded garments in this position.

While not shown, the tension strap 35 has an important function during this operation as well as during shipping; that is, the strap helps hold the clothing snuggly against and around the folding bar to help minimize wrinkling. As stated above, the tension strap is elastic to accommodate varying amounts (and thus thicknesses) of such clothing around the bar.

Lastly, the traveler clips the divider pad 6, which is preferably a relatively conventional divider pad with a conventional releasable fastener at each upper corner, over the thus folded hanging garments. Then, the traveler closes the lid shell of the case, closes the latches, and proceeds to use the wheel and tow bar assembly normally a part of most upright luggage cases.

Unpacking is essentially easily done using a reverse of the above-detailed steps.